

WE CLAIM:

1. A repeater adapted to transparently mediate signaling between a wireless communications device and a wireless communications network, the repeater comprising:
 - a Directional Donor Unit (DDU) adapted to maintain a network link with a transceiver of the wireless communications network;
 - a Subscriber Coverage Unit (SCU) adapted to maintain a local link with the wireless communications device within a personal wireless space of the repeater, the SCU comprising:
 - means for detecting respective uplink and downlink channel frequencies of the wireless communications device; and
 - control means adapted to control at least the SCU to selectively receive and transmit signals within the detected uplink and downlink channel frequencies.
2. A repeater as claimed in claim 1, wherein the DDU comprises:
 - a directional donor antenna (DDA) adapted to receive downlink channel signals from a base station of the wireless communications network, and to transmit uplink channel signals within a comparatively narrow beam to the base station; and

- a transceiver diplexer (TRD) adapted to amplify received downlink channel signals and control a transmit power level of the uplink signals.
3. A repeater as claimed in claim 2, wherein the DDA is vertically polarized.
 4. A repeater as claimed in claim 2, wherein the DDA and the TRD are integrated into a single unit.
 5. A repeater as claimed in claim 1, wherein the SCU comprises:
 - a subscriber coverage antenna (SCA) adapted to receive uplink RF signals from the wireless communications device, and transmit downlink RF signals as a comparatively wide beam; and
 - a dual-directional processor (DDP) adapted to control respective power levels of the uplink and downlink RF signals.
 6. A repeater as claimed in claim 5, wherein the SCA is horizontally polarized.
 7. A repeater as claimed in claim 5, wherein the SCA and the DDP are integrated into a single unit.
 8. A repeater as claimed in claim 5, wherein the DDP comprises means for controlling a transmit power level of the uplink RF signals based on a received power level of the downlink RF signals.
 9. A repeater as claimed in claim 1, wherein the DDU and the SCU are integrated into a single unit.

10. A repeater as claimed in claim 1, wherein the DDU and the SCU are provided as separate units coupled together by a transmission path adapted to convey the uplink and downlink RF signals.
11. A repeater as claimed in claim 1, wherein the control means comprises:
- means for detecting at least one of an uplink channel and a downlink channel of the wireless communications device; and
- means for tuning respective uplink and downlink paths to selectively amplify RF signals within the detected uplink and downlink channels.
12. An adaptive repeater as claimed in claim 11, wherein the means for detecting at least one of an uplink channel and a downlink channel comprises means for acquiring weak desired RF signals embedded within respective broad-band channels.
13. An adaptive repeater as claimed in claim 12, wherein the means for acquiring a weak desired signal comprises:
- a respective narrow band path adapted to sample RF signals within each of the uplink and a downlink paths; and
- a detector coupled to each narrow band path and adapted to detect the weak RF signals within the sampled RF signals.
14. An adaptive repeater as claimed in claim 11, wherein the means for tuning respective uplink and downlink paths comprises:

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respective uplink and downlink Intelligent Gain Controllers (IGCs) adapted to control a power level of corresponding uplink and downlink RF signals; and

a digital controller adapted to control a gain of each IGC based on detection at least one of an uplink channel and a downlink channel.

15. A repeater as claimed in claim 1, wherein the control means further comprises means for dynamically adjusting a coverage area of the personal wireless space in accordance with a location of the wireless communications device relative to the SCU.
16. A repeater as claimed in claim 15, wherein the means for dynamically adjusting a coverage area of the personal wireless space comprises means for controlling a transmit power level of downlink RF signals transmitted by the SCA based on detected signal power of uplink RF signals received by the SCA.
17. A repeater as claimed in claim 16, wherein the means for controlling the transmit power level of downlink RF signals comprises:
 - a broadband path adapted to sample the uplink RF signal received by the SCA; and
 - a variable gain amplifier coupled to the broadband path and adapted to adjust a power level of the downlink RF signal based on the sampled uplink RF signal.

18. A method of providing wireless communications services of a wireless communications network to a subscriber located in an area that is poorly serviced by the wireless communications network, the method comprising a step of providing the subscriber with a personal repeater adapted to transparently mediate signaling between at least one wireless communications device and a base station of the wireless communications network.
19. A method of enabling a subscriber located in an area that is poorly serviced by a wireless communications network to access wireless communications services of the wireless communications network, the method comprising a step of providing the subscriber with a personal repeater adapted to transparently mediate signaling between a wireless communications device and a base station of the wireless communications network.